



RESEARCH ARTICLE

New records and range expansion in tribe Paniceae (Poaceae: Panicoideae) from Western Himalaya, India

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Abstract

In the present communication, new distribution ranges of three species of the tribe Paniceae (Poaceae) have been recorded from the western Himalayas of India, i.e., *Moorochloa eruciformis*, *Sacciolepis indica* and *Setaria homonyma* for the states of Uttarakhand, Himachal Pradesh and Jammu and Kashmir, respectively. In addition, the geographical range expansion of the endemic species *Paspalum canarae* from the eastern Himalaya to the western Himalaya is also presented. A detailed taxonomic description, notes on the habitat with updated distribution, and taxonomic notes along with photo plates are provided. Additionally, an updated distribution map of the above species is also included.

Keywords

distribution; eastern Himalaya; new records; Paspaleae; Panicoideae

Introduction

Tribe Paniceae R. Br. (1) sensu lato, the type tribe of subfamily Panicoideae of grass family Poaceae, is the second largest tribe after Poeae R. Br. (1) and includes approximately 1824 species and 122 genera worldwide (2). Members of this tribe prefer a wide range of habitats and are known to occur predominantly in subtropical and tropical zones, although some taxa are also found in sub-temperate and alpine zones (3). The distinctive characters of tribe Paniceae include bi-floret spikelet in which the upper floret is bisexual and the lower is male or sterile, glumes are membranous and unequal, the lower lemma resembles the upper glume, lower palea either reduced or absent, upper lemma and upper palea are crustaceous or coriaceous, indurate and have inflexed margins. Upper lemma tightly clasps upper palea, and awnless (4).

In Indian context, the first taxonomic account of tribe Paniceae R. Br. was given by Hooker (5), who reported ca 192 species under 30 genera in his Flora of British India. After that, Bor (4) documented ca 178 species under 30 genera. In addition, over the years, checklists for tribe Paniceae have also been published by different workers, including Karthikeyan (6), Moulik (7) and more recently by Kellogg *et al.* (8). At present, from India, Paniceae *s.l.* comprises ca 185 species under 23 genera (8). In Western Himalaya, Paniceae *s.l.* is the third largest tribe after Andropogoneae Dumort. and Poeae R. Br., and is represented by 16 genera and 82 species (9). Some state (10) and regional floras (11-16) have been documented as the members of Paniceae

in Western Himalaya, yet a comprehensive taxonomic account is still required to update the taxonomy and distribution of each species.

The molecular and phylogenetic studies show that the tribe Paniceae *sensu lato* (*s.l.*) is no longer considered a monophyletic group, and the tribe Paspaleae J. Presl (17) has been separated and reinstated (18-20). Nevertheless, Paspaleae is morphologically indistinguishable from Paniceae *sensu stricto* (*s.s.*) (18-20). In India, the tribe Paspaleae is represented by ca 17 species belonging to four genera, viz., *Acroceras* Stapf, *Hiladaea* C. Silva & R.P. Oliveira, *Hymenachne* P. Beauv. and *Paspalum* L, whereas Paniceae *s.s.* is by 168 species under 19 genera (8).

During revisionary studies of the tribe Paniceae *s.l.* from Western Himalaya, India, the authors have collected some interesting specimens from different localities. After a critical examination of these specimens, perusal of relevant literature and the consultation of herbarium specimens, the new distributional ranges of *Moorochloa eruciformis* (Sm.) Veldkamp (21), *Sacciolepis indica* (L.) Chase (22) and *Setaria homonyma* (Steud.) Chiov. (23) are recorded based on specimens collected from Uttarakhand, Himachal Pradesh and Jammu and Kashmir, respectively. Furthermore, we have newly recorded *Paspalum canarae* (Steud.) Veldkamp (24) (endemic to India) for the first time to Western Himalayas flora based on specimens gathered from Uttarakhand. It was previously known from Assam, Meghalaya and Nagaland, and now from Uttarakhand, thus expanding its range from the eastern to the western Himalaya (25).

Materials and Methods

Specimens were collected from various locations in the western Himalaya, India between 2019 to 2022. Conventional herbarium techniques were used for the preparation of voucher specimens (26) and processed specimens were submitted to LWG (27). Specimens were examined, dissected, and imaged under a Leica stereo-zoom microscope equipped with a 120 x HD camera. The relevant literature was consulted and herbarium specimens housed in CAL, DD, BSD, BSHC, FL, K, KASH, LWG, MO, OXF, P, RRLH, TUB and W were also examined digitally or in person for identification and distribution status (27). Based on data from our own collection, literature, herbarium specimen records, and from the Global Biodiversity Information Forum (GBIF) (28), a cumulative updated distribution map (Fig. 1) was created using Q-GIS 3.20 software (29), if the geographical coordinates of the collection points were not clear, the coordinates were then assigned based on the nearest location point.

Results and Discussion

1. *Moorochloa eruciformis* (Sm.) Veldkamp, Reinwardtia 12(2): 139. 2004. Kellogg & al., Checklist of the grasses of India. PhytoKeys 163: 252. 2020.

≡ *Panicum eruciforme* Sm., Fl. Graec. (Sibthorp) 1: 44, t. 59. 1806.

≡ *Brachiaria eruciformis* (Sm.) Griseb. in Ledeb., Fl. Ross. 4: 469. 1853; Bor, Grass. Burma Ceylon India Pakistan: 283.

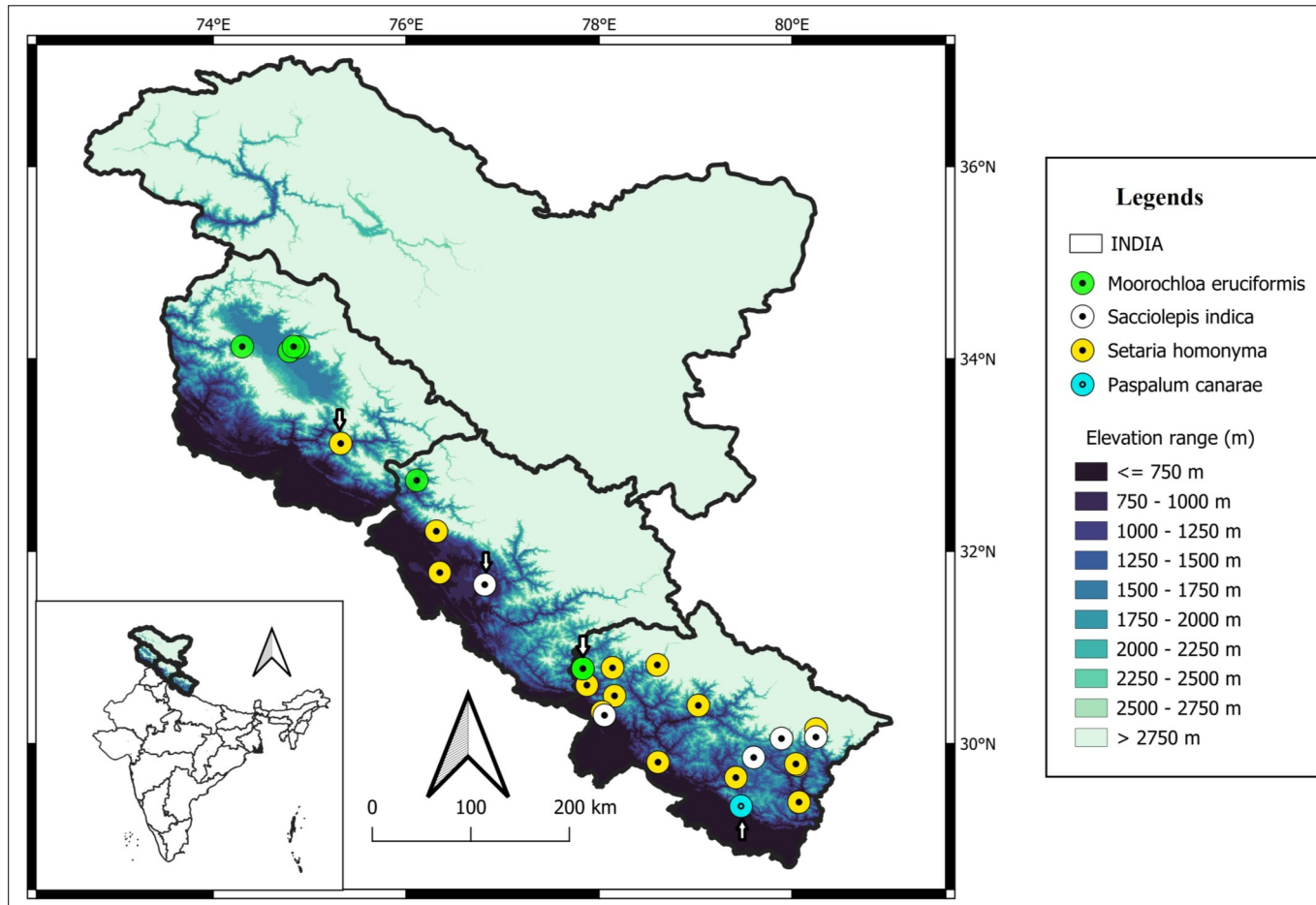


Fig. 1. Distribution of *Moorochloa eruciformis*, *Sacciolepis indica*, *Setaria homonyma* and *Paspalum canarae* in Western Himalaya, India (Arrow '→' indicate new records of the species).

1960; G. Singh & al., Fl. Srinagar: 223. 1976; Karthikeyan & al., Fl. Ind. Enum. Monocot.: 190. 1989; H. J. Chowdhery and B. M. Wadhwa, Fl. Himachal Pradesh 3: 780. 1984; S. Moulik, Grass. Bamb. India 1: 76. 1997.

=*Panicum isachne* Roth ex Roem. & Schult., Syst. Veg. ed. 15. 2: 458. 1817; Hook. f., Fl. Brit. India 7: 28. 1896.

Type: Annual, loosely tufted. **Culms** 30–40(–60) cm long, decumbent, ribbed, glabrous to sparsely hairy. **Nodes** pubescent. **Leaf-sheaths** compressed, sparsely hairy with hairs 0.6–0.8 mm long, mouth bearded, margins overlapping; ciliate. **Ligules** rim of 0.8–1.2 mm long whitish hairs. **Leaf blades** 3–10×0.5–0.8 cm, lanceolate, sparsely hairy on both sides, nerves distinct, acute-acuminate at apex, truncate at base, margins hairy. **Panicles** 5–9 cm long, narrow, erect, axis hairy. **Racemes** 3–5 cm long, 5–9 in number, alternate, appressed on axis, rachis triquetrous; pubescent hairy. **Spikelets** solitary, arranged in two rows, imbricate, 1.9–2.2×0.8–0.9 mm, ovate-lanceolate, greenish, sparsely hairy, apex acute; purplish, base rounded. **Pedicels** of equal length, ca. 0.4 mm long. **Lower glume** 0.3–0.4×0.3–0.4 mm, ovate, membranous, greenish, glabrous, 1–3 nerved, apex sub-acute, base truncate, margin inflexed. **Upper glumes** 1.7–1.8 × ca 0.9 mm, oblong-lanceolate, membranous, greenish, sparsely hispid hairy; hairs ca 0.5 mm long, 5-nerved, apex sub-acute, margins hyaline. **Lower florets** paleate, male or barren. **Lower lemma** 1.8–1.9×0.9 mm, similar to upper glume, lanceolate, greenish, membranous, sparsely hispid hairy, 5-nerved, apex sub-acute, and margins hyaline. **Lower palea** ca 1.3×0.5 mm, oblong-elliptic, membranous, glabrous, 2-nerved, apex subacute. **Upper florets** fertile and readily deciduous. **Upper lemmas** 1.2–1.5×0.5–0.6 mm, oblong, subcoriaceous, smooth, shiny, 3–5 nerved, apex obtuse, margin inflexed; clasping upper palea. **Upper paleas** 1.1–1.3×0.5 mm, elliptic, subcoriaceous, smooth, shiny, elliptic, 2-nerved, apex subacute to obtuse, margin inflexed. **Stamens**-3, anthers 0.6–0.9 mm. **Ovaries** 0.2–0.4×0.1–0.2 mm, oblong. **Lodicules** 2. **Caryopsis** ca. 1.0×0.70 mm, elliptic, apex obtuse, base rounded. (Fig. 2)

Flowering and fruiting : July-October.

Habitat: *Moorochloa eruciformis* grows near forest margins, on mountain slopes, along roadsides, in waste places, and as a weed in the fields and is usually found in between 1000–2400 m asl.

Distribution: India: Western Himalaya [Himachal Pradesh, Jammu & Kashmir and Uttarakhand (First time)], Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Meghalaya Odisha, Rajasthan, Tamil Nadu and West Bengal.

Notes: *Moorochloa eruciformis* is the only known representative of the genus *Moorochloa* Veldkamp from India. Previously, this species was placed under the genus *Brachiaria* (Trin.) Griseb. but was later transferred to *Moorochloa* by Veldkamp to avoid nomenclatural instability. This species is characterized by having a panicle with unilateral ascending appressed racemes, spikelets are solitary, imbricate and hairy, and the upper floret is readily deciduous.

Specimens examined: INDIA, **Uttarakhand**, Dehradun district, Chakrata, near Kanasar Shiv Koti temple, 30.779982°N 77.832800°E, 2200 m, 23 August 2022, *D. Prasad*, *S. Sharma* and *S. Tiwari* 324650 (LWGI!); **Himachal Pradesh**, Chamba district, Kalhel, 03 September 1896, *J.F. Duthie* 18463 (DD!); **Jammu and Kashmir**, Srinagar district, Srinagar, 5300 ft, 04 July 1891, *G. A. Gammie* s.n. (DD!), Husain Bagh, 19 July 1940, *R. R. Stewart* 19414 (DD!), Kashmir University campus, 17 August 1973, *Bimal Misri* 26 (KASH!); Baramulla district, Gulmarg, *H. Thakur* 1075 (KASH!).

2. *Sacciolepis indica* (L.) Chase, Proc. Biol. Soc. Wash. 21: 8. 1908. Bor, Grass. Burma Ceylon India Pakistan: 357. 1960; Babu, Herb. Fl. Dehradun: 639. 1977; Naithani, Fl. Chamoli 2: 720. 1985; Karthikeyan & al., Fl. Ind. Enum. Monocot.: 256. 1989; S. Moulik, Grass. Bamb. India 1: 149. 1997; Gaur, Fl. Garhwal: 688. 1999, Uniyal & al., Fl. Pt. Uttarakhand: 273, 2007; Kellogg & al., Checklist of the grasses of India. PhytoKeys 163: 269. 2020.

=*Aira indica* L., Sp. Pl. 1: 63. 1753.

=*Panicum indicum* (L.) L., Mant. Pl. 2: 184. 1771, non Mill. 1768; Hook. f., Fl. Brit. India 7: 41. 1896.

Type: SRI LANKA, Sabaragamuwa Province, Ratnapura District, 22 October 1974, *G. Davidse* 7871 [neotype K (K000245262 (digital image!); isoneotype MO (MO-1410733 (digital image!))] designated by Renvoize in Cafferty *et al.*, *Taxon* 49: 244 (2000).

Annual, tufted, **Culms** 40–80 cm, erect to geniculate-ly ascending, terete, smooth, simple or branched. **Nodes** brownish, glabrous. **Leaf sheaths** 4–12 cm long, compressed, keeled, glabrous or occasionally sparsely hairy, mouth bearded or not, margin overlapping. **Ligules** 0.2–0.5 mm long, membranous, truncate, hairy at apex; hairs 0.3–0.6 mm long. **Leaf blades** 5–15×0.7–1.0 cm, linear-lanceolate, glabrous, apex acuminate, margin inrolled, serrulate. **Inflorescences** ca. 10 cm long, terminal, spicate panicle, spikelets alternately and compactly arranged on the central axis, peduncle 20–30 cm long. **Spikelets** 2.9–3.4×0.9–1.0 mm, obliquely ovate-lanceolate, greenish, glabrous, sparsely hairy at apex, apex acute, base rounded. **Pedicels** 0.3–0.8 mm long, apex disc-shaped. **Lower glumes** 1.6–2.1×0.9–1.0 mm, lanceolate, membranous, greenish, 5-nerved, apex obtuse, and margin hyaline. **Upper glumes** 2.9–3.2×0.8–0.9 mm, lanceolate, membranous, oblique, slightly bulgy at dorsal side, glabrous or occasionally hairy towards apex, 7–9 nerved, apex acute. **Lower florets** epaleate, barren. **Lower lemmas** 2.9–3.2×0.8–0.9 mm, lanceolate, membranous, sparsely hairy, 9–11 nerved, and apex acute. **Lower paleas** 1.0–1.3×0.3–0.4 mm, lanceolate, 2-nerved, acute at apex. **Upper florets** bisexual. **Upper lemmas** 1.9–2.0×0.6–0.7 mm, lanceolate-elliptic, subcoriaceous, smooth, shining, 3-nerved, apex acute, margin inflexed clasping palea tightly. **Upper paleas** 1.7–1.9×0.4–0.5 mm, elliptic-lanceolate, subcoriaceous, smooth, shiny, 2-nerved, acute, margin inrolled. **Lodicules**-2. **Stamens**-3; anthers 0.4–0.5 mm long. **Caryopsis** 1–1.2×0.5–0.7 mm, oblong to elliptic, brownish (Fig. 3).

Flowering and fruiting: August-October.

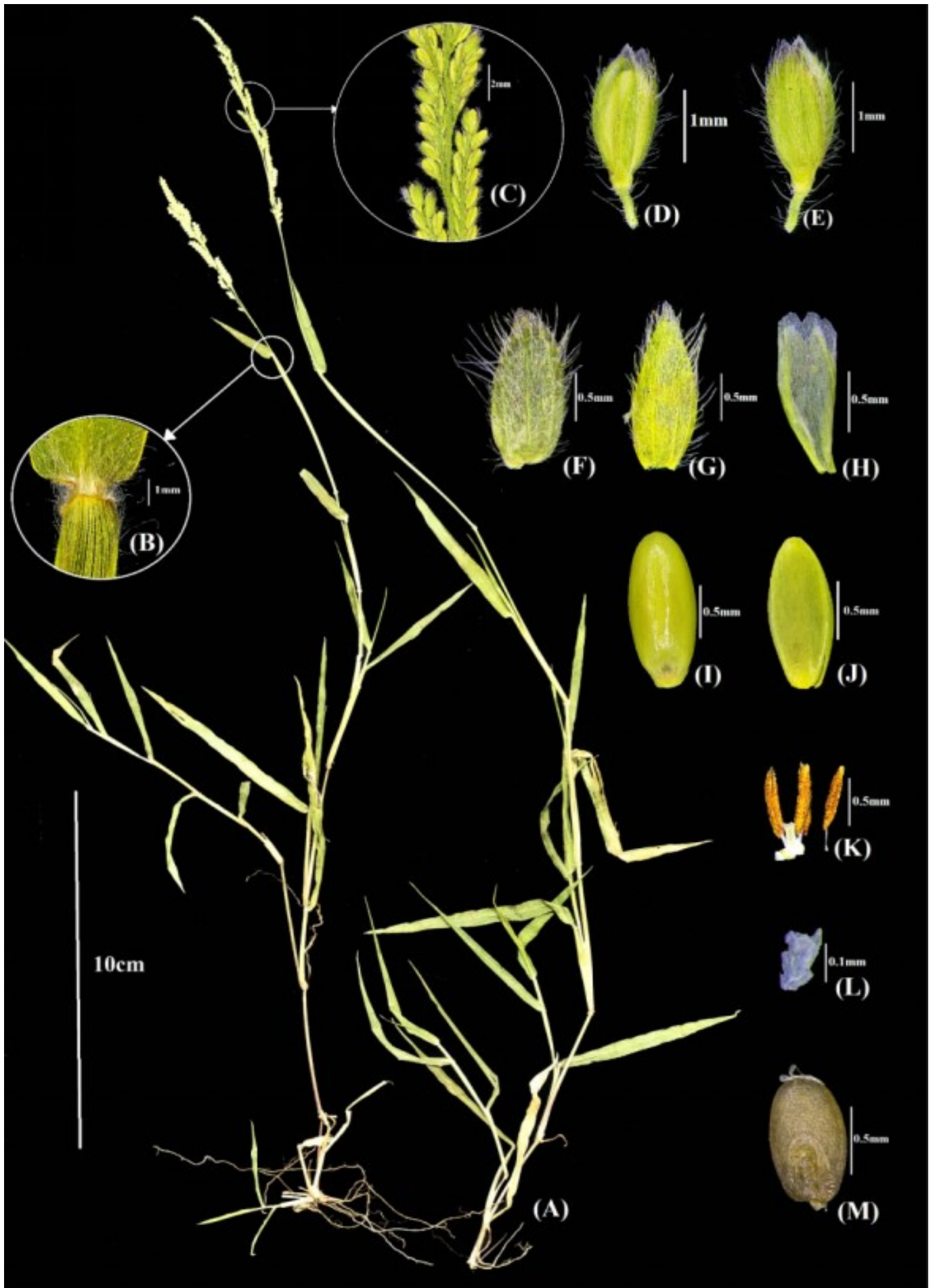


Fig. 2. *Moorochloa eruciformis* (Sm.) Veldkamp: (A). Habit (B). Ligule (C). Racemes (D, E). Spikelet (dorsal and ventral view) (F). Upper glume (G). Lower lemma (H). Lower palea (I). Upper lemma (J). Upper palea (K). Stamens (L). Lodicule (M). Caryopsis.

Habitat: *Sacciolepis indica* prefers to grow in moist places such as along the bank of streams, ponds, lakes, ditches, rice fields, etc. and can be found up to 2500 m. above the sea level.

Distribution: India, Western Himalaya [Himachal Pradesh (first time) and Uttarakhand], Andhra Pradesh, Assam,

Chhattisgarh, Goa, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Manipur, Maharashtra, Meghalaya, Nagaland, Odisha, Tamil Nadu, Uttar Pradesh.

Notes: *Sacciolepis indica* is recognised by culm not spongy at the base, presence of spicate narrow cylindrical uninterupted panicle with alternately or spirally arranged spike-

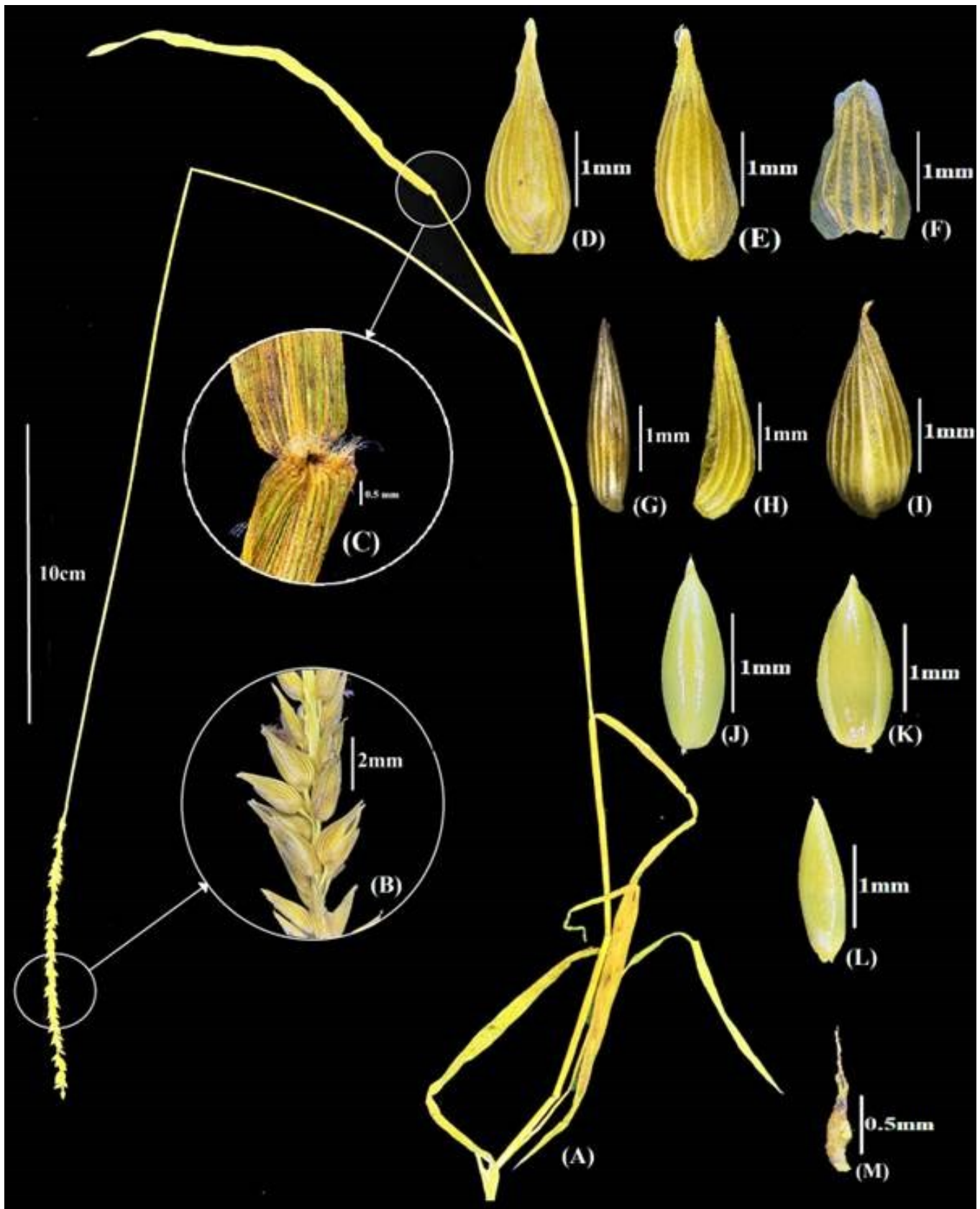


Fig. 3. *Sacciolepis indica* (L.) Chase: (A). Habit (B). Ligule (C). Racemes (D, E). Spikelet (lateral and ventral view) (F). Lower glume (G, H). Upper glume (dorsal and lateral view) (I). Lower lemma (J, K). Upper lemma (dorsal and ventral view) (L). Upper palea (M). Caryopsis.

let, spikelet (2.5–)2.8–3.2(–3.5) mm long, ovate-lanceolate, acute to acuminate. It differs from *S. interrupta* (Willd.) Stapf by rigid and slender culm (vs spongy and robust culm), ligule 0.2–0.5 mm long (vs. 1.8–2.5 mm long), panicle uninterrupted (vs. panicle interrupted), spikelet 2.5–3.5 mm long (vs. 4–5 mm long), lower glume half the length of spikelet (vs. less than half the length of spikelet), lower lemma sparsely hairy (vs. glabrous), and from *S. myosuroides* (R. Br.) A. Camus by spikelet 2.5–3.5 mm long, ovate-lanceolate, acute to acuminate at apex (vs. spikelet 1–2 mm long, ovate-oblong, sub-globose, obtuse at apex).

Specimens examined : INDIA, **Himachal Pradesh**, Mandi district, Bhadrola, Kalar village, 31.652710° N, 76.815548° E, 1550 m, 04 September 2021, *S. Jaiswal & R. Waris 336832* (LWG!); **Uttarakhand**, Dehradun district, Rispana, 27 September 1914, *C. R. Babu 34793* (BSD!); Pithoragarh district, Munsiyari, near Nanda Devi temple, 19 September 2003, *Manish K. Kandwal 147* (BSD!); Bagheshwar district, Loharkhet to Dhakuri, 11 September 2003, *Manish K. Kandwal 1183* (BSD!), Kausani, near tea factory, 12 September 2005, *Manish K. Kandwal 4707* (BSD!).

3. *Setaria homonyma* (Steud.) Chiov., *Nuovo Giorn. Bot. Ital.* n. s. 26: 78. 1919. *Bor, Grass. Burma Ceylon India Pakistan*: 361. 1960; Karthikeyan & al., *Fl. Indicae Enum. Monocot.*: 258. 1989; S. Moulik, *Grass. Bamb. India* 1: 153. 1997; H. J. Chowdhery and B. M. Wadhwa, *Fl. Himachal Pradesh* 3: 791. 1984; Naithani, *Fl. Chamoli* 2: 721. 1985; Gaur, *Fl. Gharwal* 690. 1999, Uniyal & al., *Fl. Pt. Uttarakhand*: 274. 2007; Kellogg & al., *Checklist of the grasses of India. PhytoKeys* 163: 273. 2020.

≡ *Panicum homonymum* Steud., *Syn. Pl. Glumac.* 1: 48. 1853.

=*Panicum rhachitrichum* sensu Hook.f., *Fl. Brit. India* 7: 56. 1896, non Hochst. 1844.

Type : NEPAL, *Royle 47* [holotype P; isotype K]

Annual, loosely tufted. **Culms** 40–100 cm, erect, slender, branched, glabrous. **Nodes** pubescent. **Leaf sheaths** 4–8 cm long, compressed and keeled, glabrous or occasionally hairy, mouth bearded, margins hairy. **Ligules** rim of hair; hairs ca. 1.0 mm long. **Leaf blades** 5–17×0.8–1.5 cm, elliptic-lanceolate, with sparsely tuberculate ca. 1.0 mm hairs, plicate near the base, acuminate at apex, margin serrulate. **Inflorescences** 8–15 cm long panicle, made up of alternately arranged racemes, pyramidal, lax, axis triquetrous; distantly hairy. **Racemes** 3–5 cm long, rachis triquetrous, spikelet alternately arranged on rachis. **Spikelets** solitary, 2.0–2.3×0.9–1.0 mm, broadly elliptic, glabrous, apex acute. **Pedicels** ca 1.0 mm long, triquetrous scabrid, truncate, subtended by single bristle. **Bristles** 1.5–2.5 times longer than spikelet, antrosely scabrid. **Lower glumes** 07–0.8×0.6–0.9 mm, orbicular, membranous, encircles the spikelet at the base, glabrous, 3-nerved, apex obtuse, hyaline at margins. **Upper glumes** 1.6–1.9×0.8–0.9 mm, nearly equal to spikelet, elliptic to oblong, membranous, 5-nerved, obtuse at apex. **Lower florets** paleate, male or barren. **Lower lemmas** 2.0–2.3×0.7–0.9 mm, elliptic-ovate, glabrous,

membranous, 5–7 nerved, acute at apex. **Lower paleas** 1.3–1.5×0.3–0.5 mm, lanceolate-narrowly elliptic, membranous, hyaline, 2-nerved, apex obtuse. **Upper florets** bisexual. **Upper lemmas** 1.7–2.0×0.8–0.9 mm, 5-nerved, broadly elliptic-oblong, sub-coriaceous, dorsally rugose, apex obtuse, margins inflexed and clasping palea firmly. **Upper paleas** 1.3–1.5×0.6–0.7 mm, elliptic-oblong, sub-coriaceous, dorsally granulate-rugose, 2-nerved, apex obtuse, margin inflexed. **Stamens**-3; anthers 0.8–1.2 mm long (Fig. 4).

Flowering and fruiting: July–October.

Habitat: *Setaria homonyma* prefers shady environments, and usually grows on hill slopes, at forest edges and along roadsides between 600 m to 1900 m asl.

Distribution: India : Western Himalaya [Himachal Pradesh, Jammu and Kashmir (first time), and Uttarakhand], Andhra Pradesh, Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, West Bengal.

Notes: *Setaria homonyma* is an annual grass species characterized by leaves plicate at the base, open panicle inflorescence, dorsally compressed and blunt spikelets subtended by a single bristle, upper glume almost equaling dorsally rugose upper lemma. It differs from its allied *S. barbata* (Lam.) Kunth by blunt spikelet (vs. apiculate apex), upper glume length nearly equal to the spikelet (vs. distinctly shorter), and upper lemma transversely rugose (vs. smooth upper lemma).

Specimens examined : INDIA, **Jammu & Kashmir**, Ramban district, Batote, 33.120555° N 75.322223° E, 1592 m, 19 July 2019, *S. Jaiswal, S. Tripathi & R. Yadav 314495* (LWG!); **Himachal Pradesh**, Kangra district, Dharamshala, 21 September 1906, *G. A. Gammie 18652* (DD!); **Uttarakhand**, Pithoragarh, near Berinag, 1700 m, 27 September 2022, 29.788502 80.041257, *S. Jaiswal 347719* (LWG!), Uttarkashi district, Raithal, 9 September 2002, *Manish K. Kandwal 1125* (BSD!); Dehradun district, Bindal, 25 August 1964, *C. R. Babu 33485* (BSD!).

4. *Paspalum canarae* (Steud.) Veldkamp in *Blumea* 21: 72. 1973. S. Moulik, *Grass. Bamb. India Vol.* 1: 128. 1997; Karthikeyan & al., *Fl. Ind. Enum. Monocot.*: 244. 1989; U. Shukla, *Grass. N.E. India*: 245. 1996; Kellogg & al., *Checklist of the grasses of India. PhytoKeys* 163: 211. 2020.

≡*Panicum canarae* Steud., *Syn. Pl. Glumac.* 1: 58. 1853.

=*Paspalum compactum* Roth, *Nov. Pl. sp.* 36. 1821; Hook. f., *Fl. Brit. India* 7: 12. 1896; *Bor, Fl. Assam* 5: 251. 1940; *Bor, Grass. Burma, Ceylon, India & Pakistan*: 336. 1960.

Type: Annual, tufted. **Culms** 8–25 cm, decumbent, geniculate, ascending, rooting from nodes, ribbed, branched, glabrous or sparsely hairy. **Nodes** brownish, whitish hairy, hairs 0.5–0.8 mm long. **Leaf-sheaths** 1–3 cm long, densely tuberculate hairy; hairs 0.3–0.6 mm long, margins overlapping, entire, densely hairy near leaf junction. **Ligules** a rim

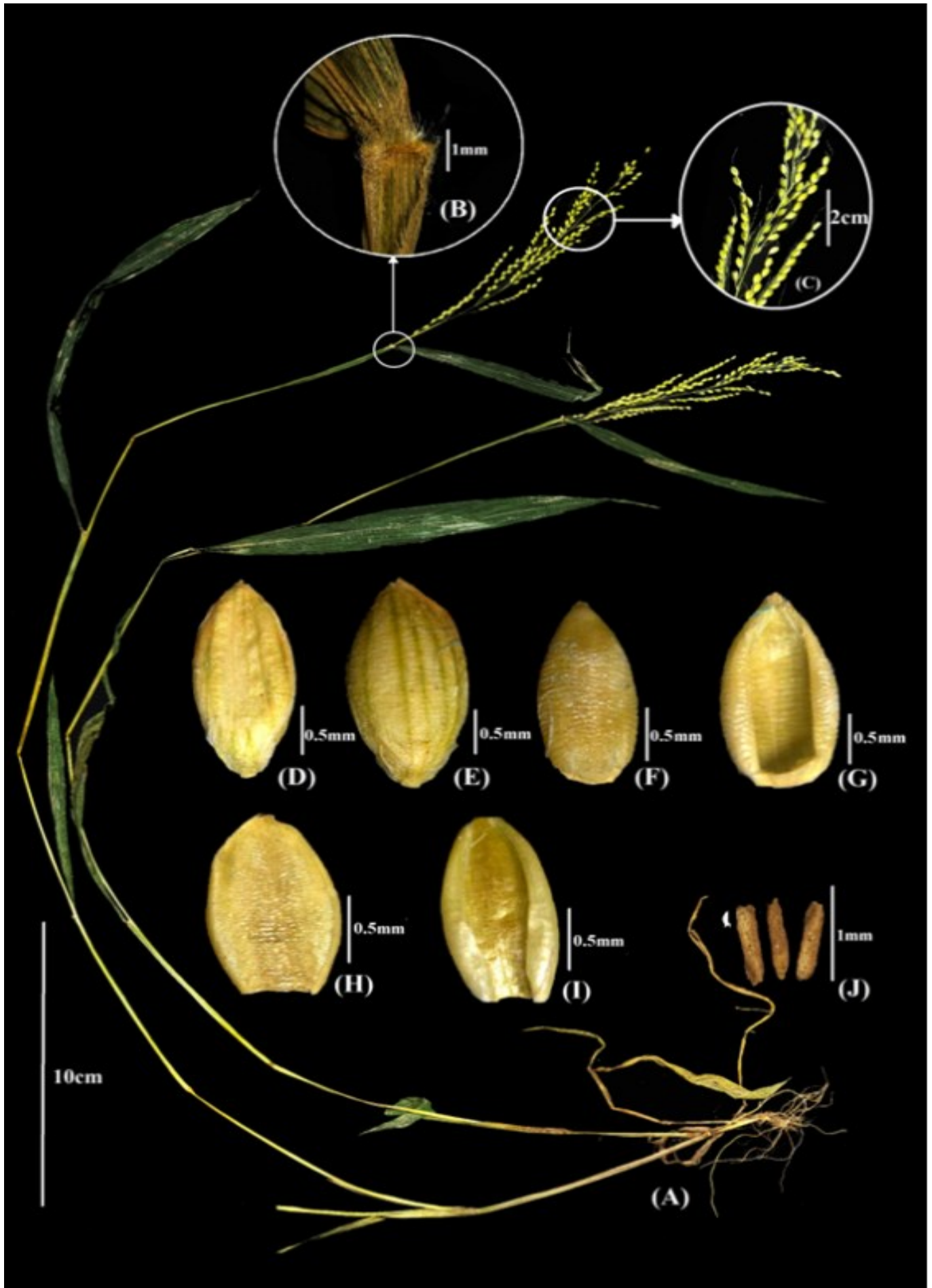


Fig. 4. *Setaria homonyma* (Steud.) Chiov.: (A). Habit (B). Ligule (C). Racemes (D, E). Spikelet (dorsal and ventral view) (F, G). Upper lemma (dorsal and ventral view) (H, I). Upper palea (dorsal and ventral view) (J). Stamens.

of hairs; hairs 0.5–0.8 mm long. **Leaf-blades** 1.5–3.5×0.9–1.0 cm, ovate-elliptic, tuberculate hairy on both surfaces; hairs 0.5–1.0 mm, acute, margins ciliate. **Inflorescence** 3–5 cm long panicle with unilateral racemes, peduncle 1–4 cm. **Racemes** 6–12 in number, 0.7–2.0 cm long, ascending, alternate, hairy at base, terminate with a spikelet, rachis flat; margins tuberculate hairy. **Spikelets** arranged in two rows, solitary, 0.9–1.3×0.6–0.8 mm, widely elliptic, acute, glabrous. **Pedicels** 0.5–0.8 mm long, terete. **Lower glumes** absent. **Upper glumes** 0.9–1.3×0.6–0.8 mm, broadly elliptic, 5-nerved, apex rounded. **Lower florets** epaleate, barren. **Lower lemmas** 0.8–1.2×0.5–0.6 mm, obovate, glabrous, 3–5 nerved, rounded at apex. **Upper florets** paleate, fertile. **Upper lemmas** 0.8–1.0×0.6–0.8 mm, ovate-elliptic,

coriaceous, 5-nerved, acute-obtuse at apex, rounded at base, margin inflexed. **Upper paleas** 0.7–0.9×0.4–0.6 mm, 2-nerved, elliptic, coriaceous, dorsally granulate, obtuse at apex, margin inflexed. **Stamens**-3; anthers 0.1–0.2 mm. **Caryopsis** 0.5–0.8 mm long, ovate-oblong (Fig. 5).

Flowering and fruiting: August–November.

Distribution: Western Himalaya [Uttarakhand (first time)], Eastern Himalaya [Assam, Meghalaya, Nagaland], Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh. [Endemic for India]

Habitat: *Paspalum canarae* tends to grow in wet places. We have reported it for the first time from the Western

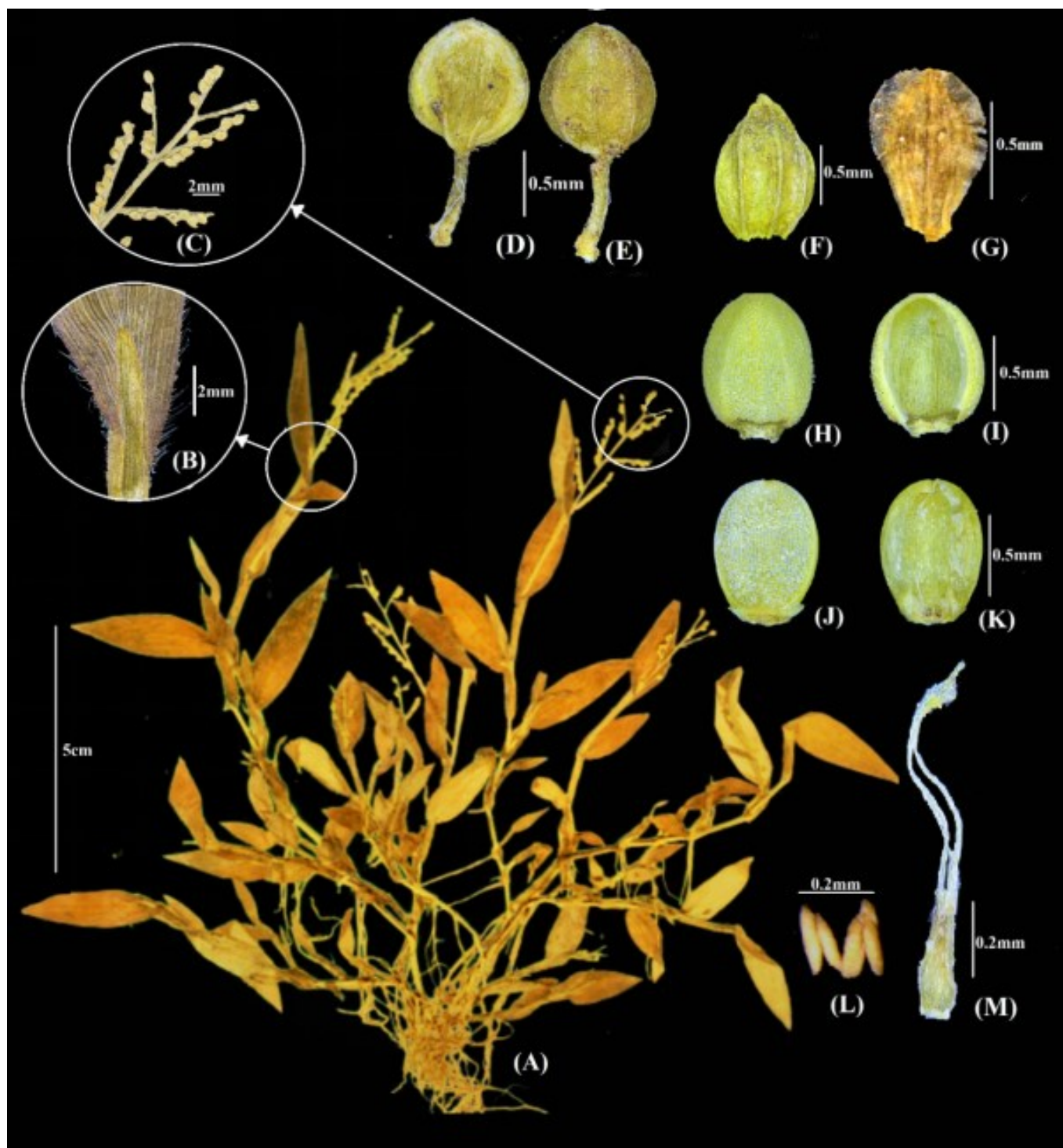


Fig. 5. *Paspalum canarae* (Steud.) Veldkamp: (A). Habit (B). Ligule (C). Racemes (D, E). Spikelet (dorsal and ventral view) (F). Upper glume (G). Lower lemma (H, I). Upper lemma (dorsal and ventral view) (J, K). Upper palea (dorsal and ventral view) (L). Stamens (M). Caryopsis.

Himalayas (Nainital, Uttarakhand), where it was found growing on wet hill slopes at an altitude of 1370 m.

Notes: *Paspalum canarae* is a small tufted annual grass species, that can be recognised by the panicle with 6–12 unilateral racemes, racemes 0.7–2.0 cm long, perpendicular to the main axis and spikelet 0.9–1.3 mm long, 0.6–0.8 mm wide. It differs from *Paspalum longifolium* Roxb. by spikelets arranged in 2-rows on rachis (vs. 4-rows), leaf surface densely hairy (vs. glabrous), and spikelet 0.9–1.3 mm long (vs. ca 2 mm long). It can be distinguished from other Indian *Paspalum* spp. by its smaller culm height of up to 25 cm (vs. 25–150 cm long), panicle with 6–12 racemes (vs. 2–6 racemes), and spikelet 0.9–1.2 mm long (vs. 1.5–4.0 mm long).

Specimen examined : INDIA, **Uttarakhand**, Nainital district, on the way from Ranibagh to Nainital, 29.349719° N, 79.472366° E, 1370 m, 13 Oct 2019, S. Jaiswal & Rehanuddin 328433 (LWG!).

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Authors' contributions

SJ performed the necessary research, designed the distribution map, and prepared the initial draft of the manuscript. RY, SS and DP edited and refined the manuscript. VKM reviewed the final draft of the manuscript and made some key additions. PA supervised the whole work and sent the manuscript for publication.

Compliance with ethical standards

Conflict of interest: The authors affirm that this research is conducted without any conflicts of interest.

Ethical issues: None.

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